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**Yanagidaira**

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(54) **PRINTER CONTROLLER**

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(58) **Field of Search** ..... **358/1.15; 709/218, 709/203; 707/104, 205; 370/395.52, 395.53; 710/5, 11, 46**

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(57) **ABSTRACT**

The printer controller controls the shared printer of a network to which the clients are connected. The clients are provided with browsers. The printer controller operates on the printer server which has a function of sending home page data containing information about the shared printer corresponding to URL from the clients connected to the network. The printer controller sends the home page data containing the information about the shared printer and performs at least one or more of operation monitoring, check and instruction of the shared printer connected to the printer server according to the received URL indicating a request of that.

**17 Claims, 10 Drawing Sheets**

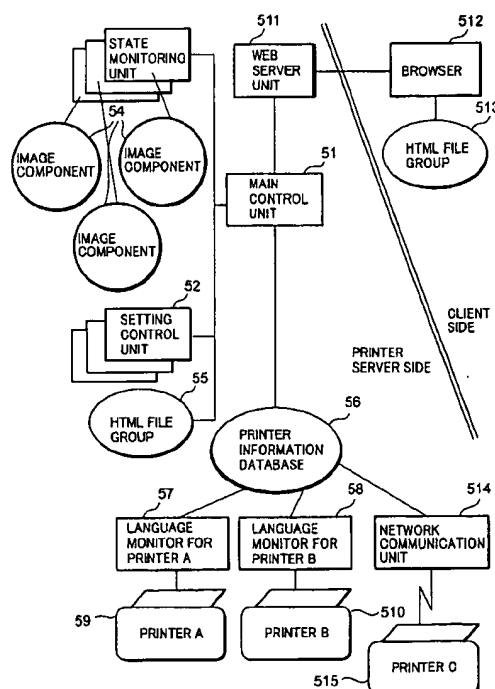


Fig.1

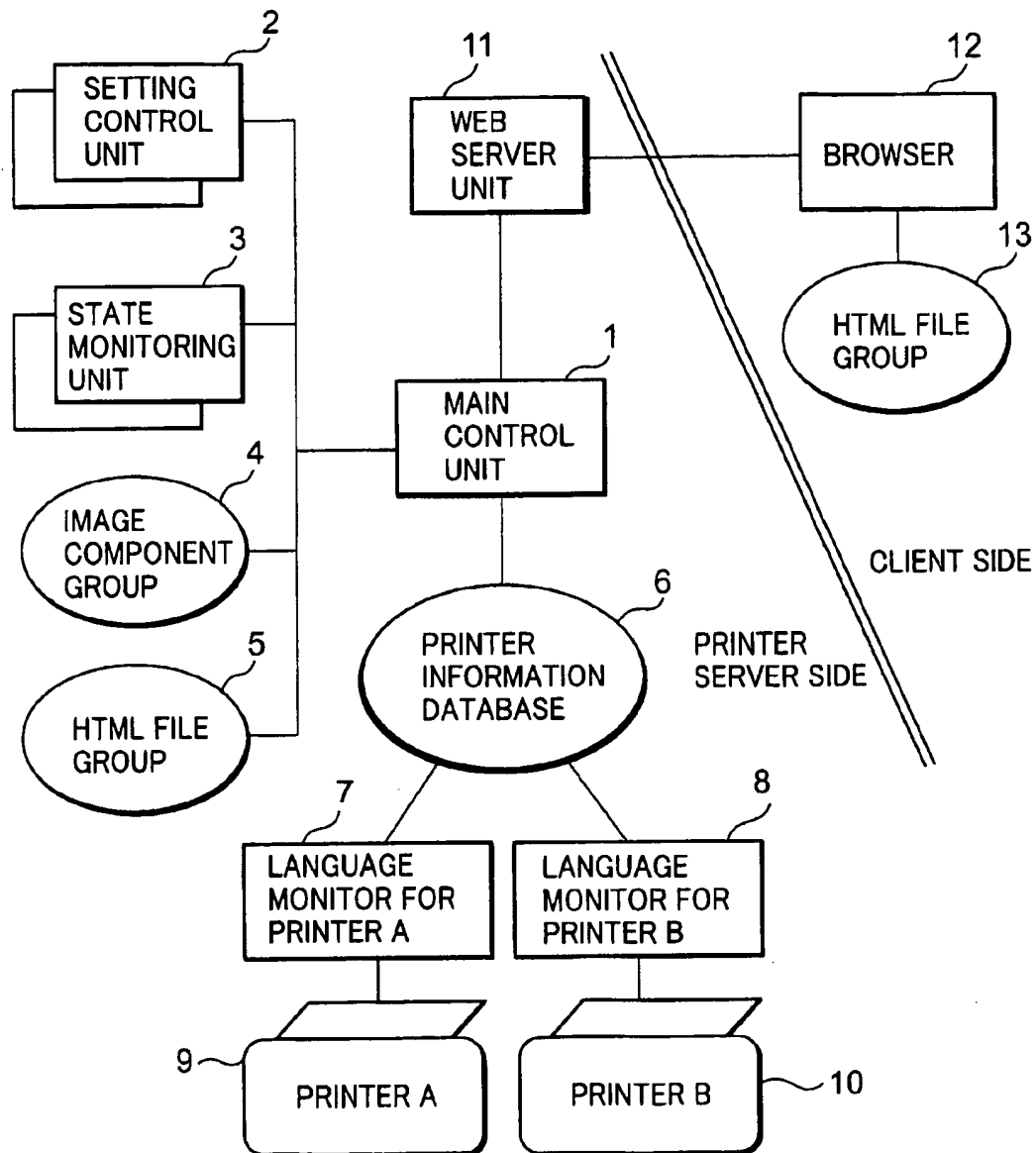


Fig.2

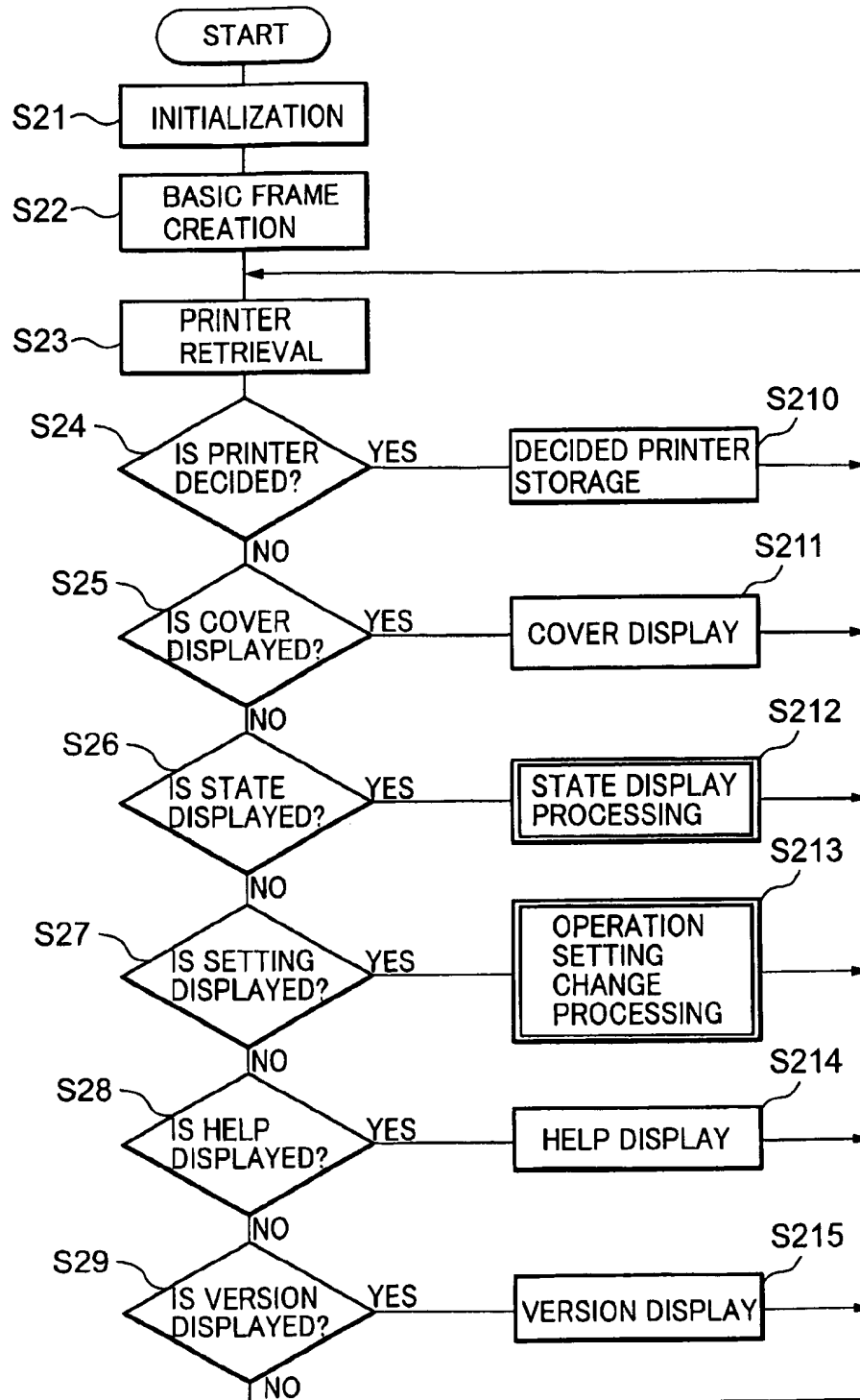


Fig.3

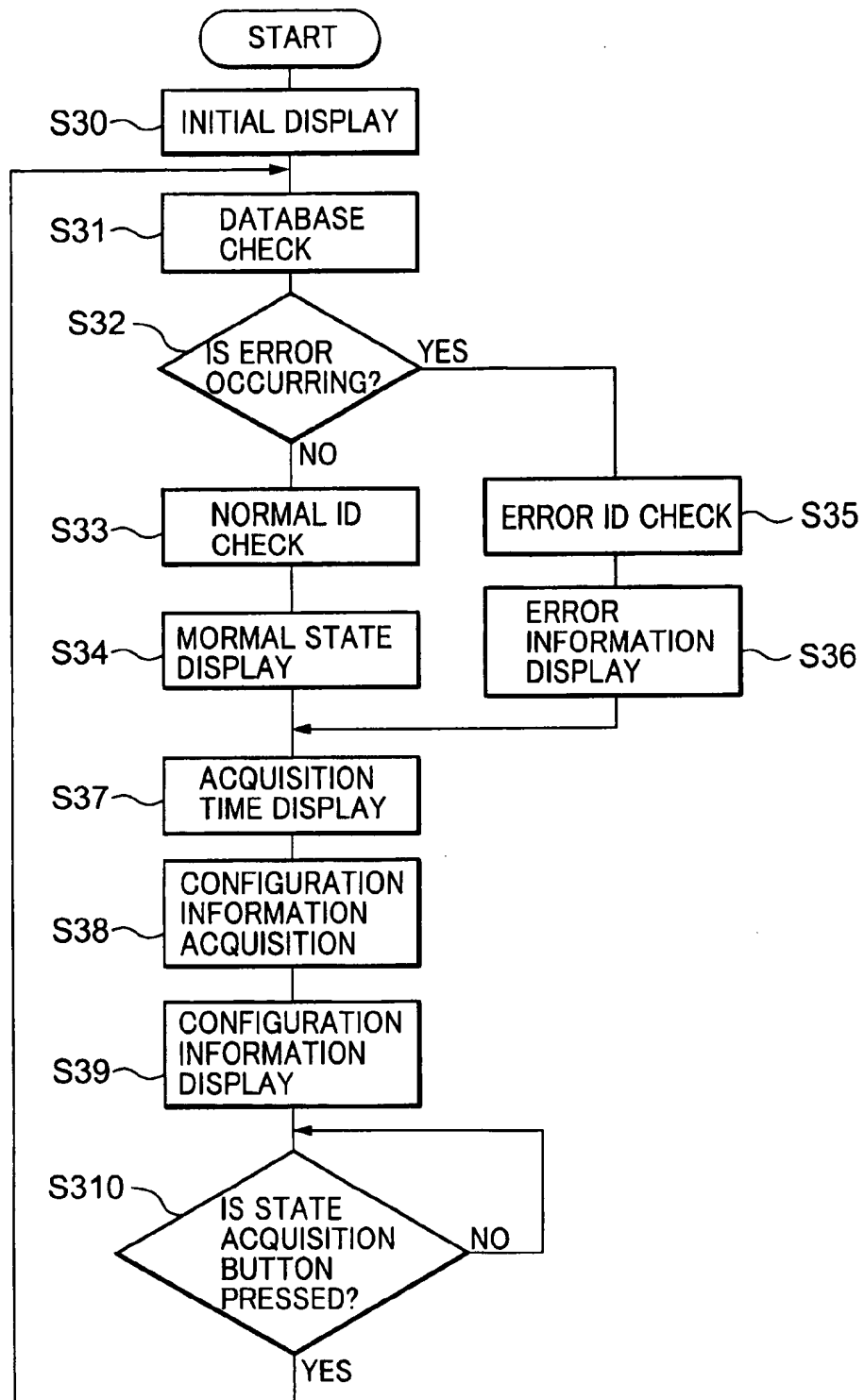


Fig.4

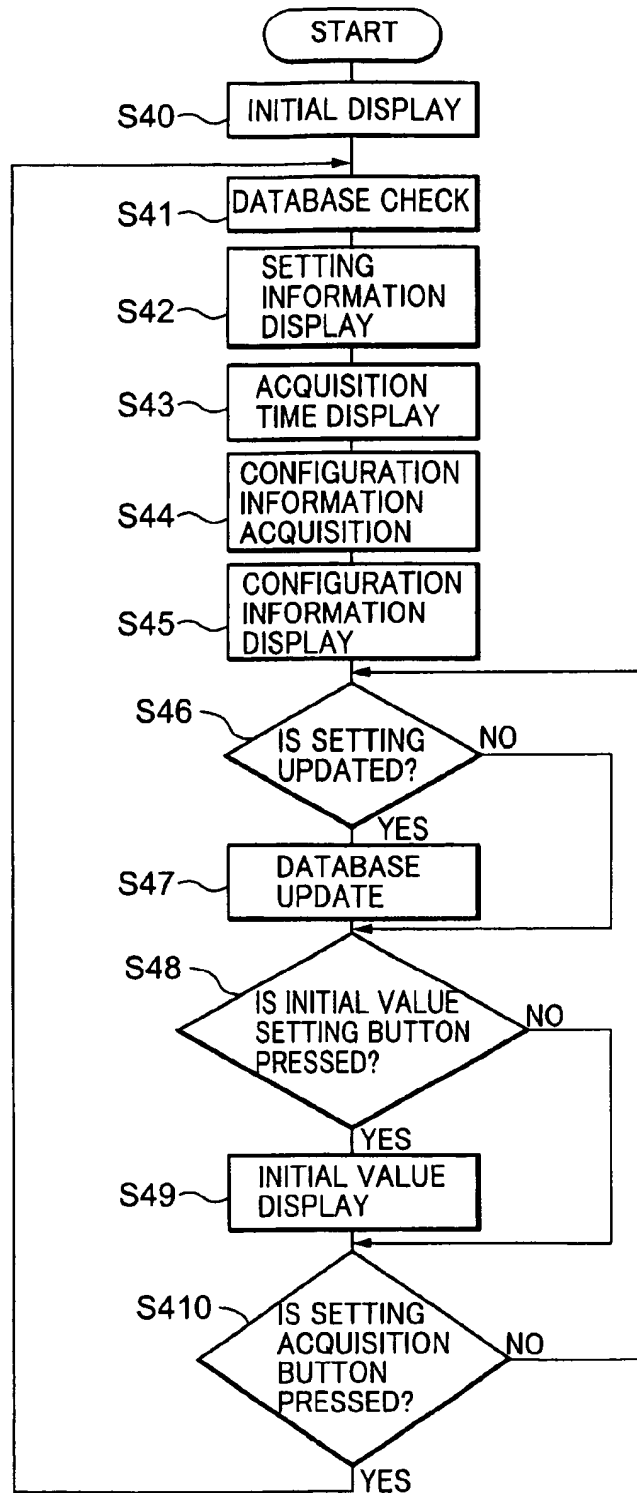


Fig.5

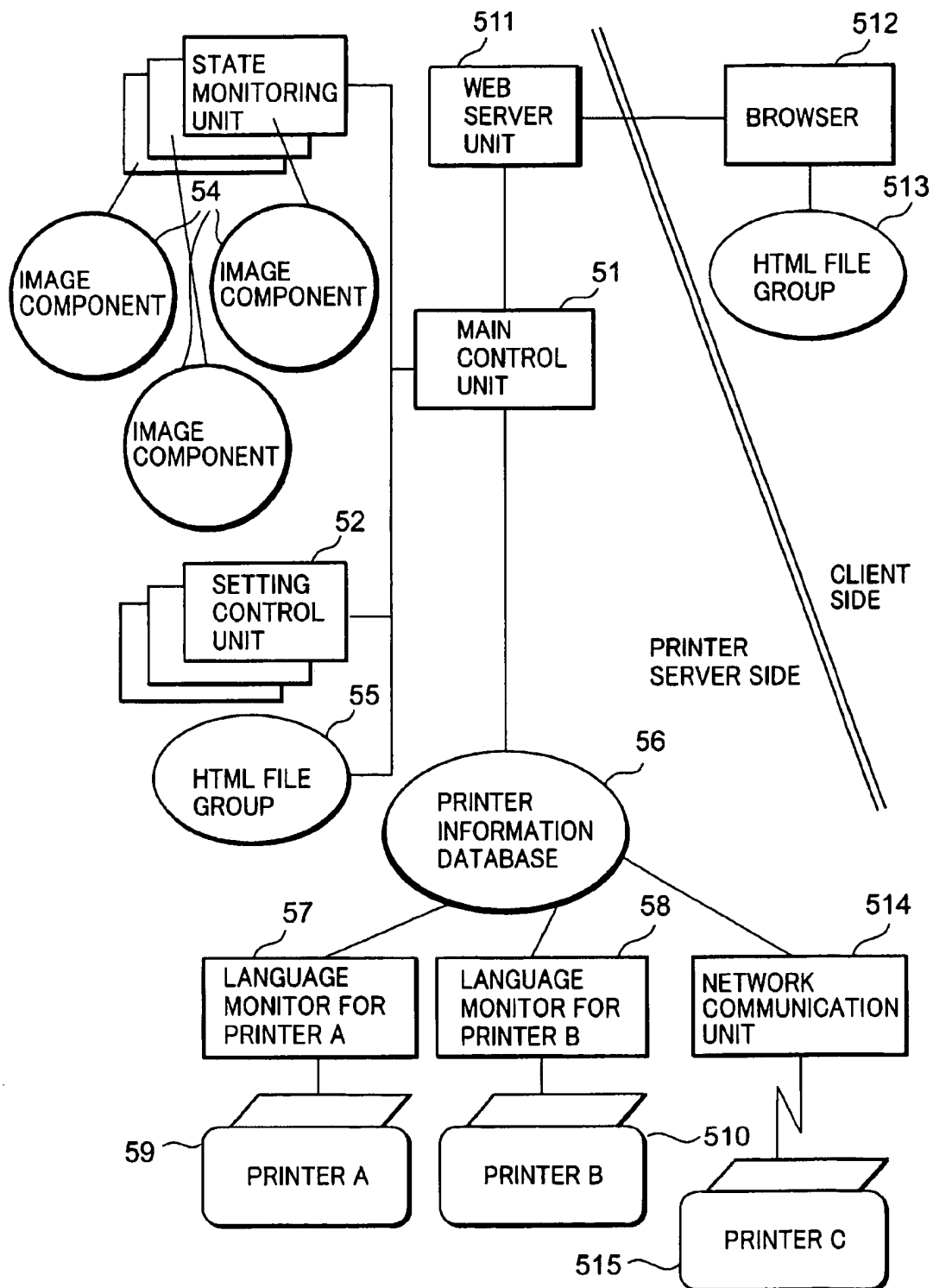


Fig.6

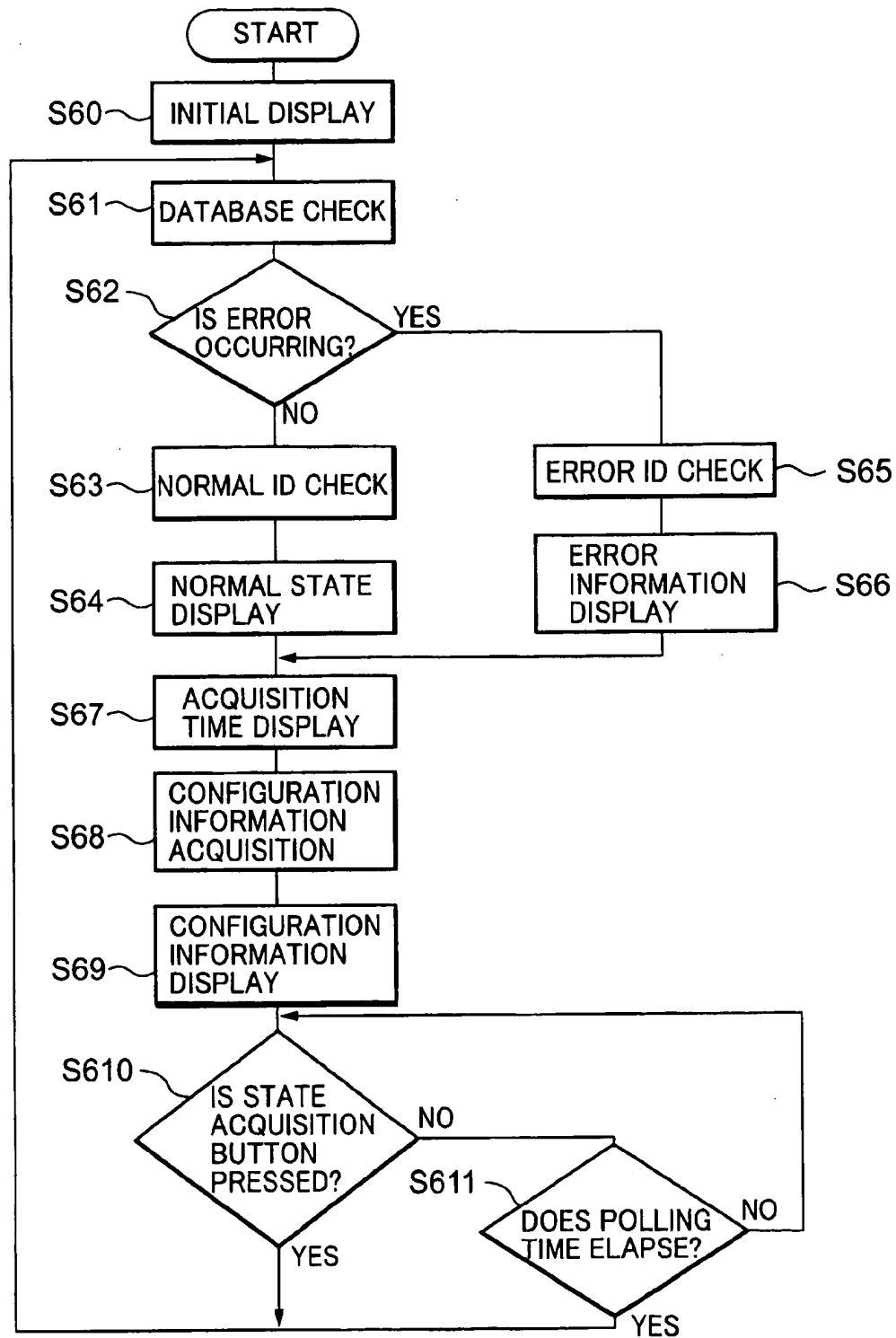


Fig. 7

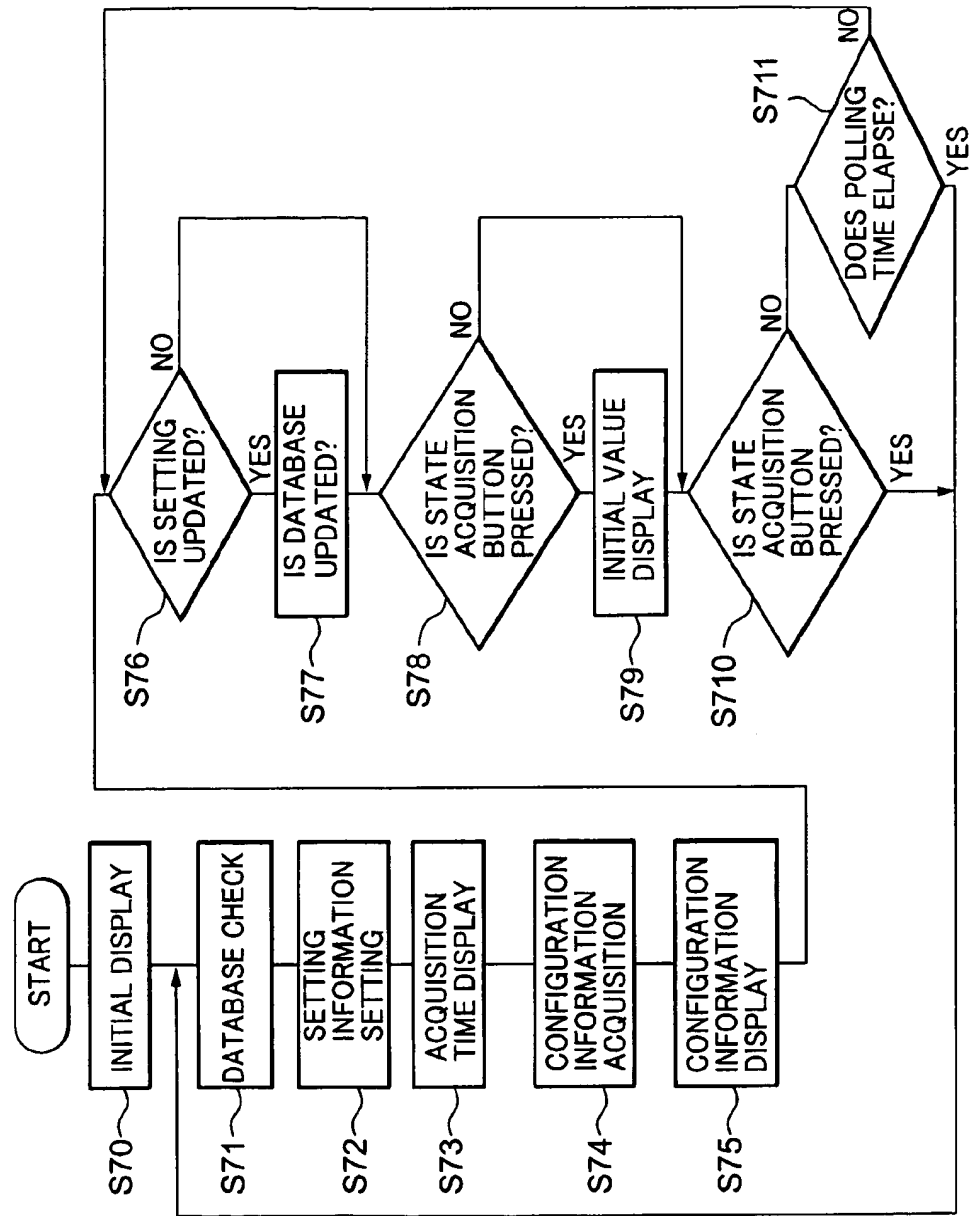




Fig. 8

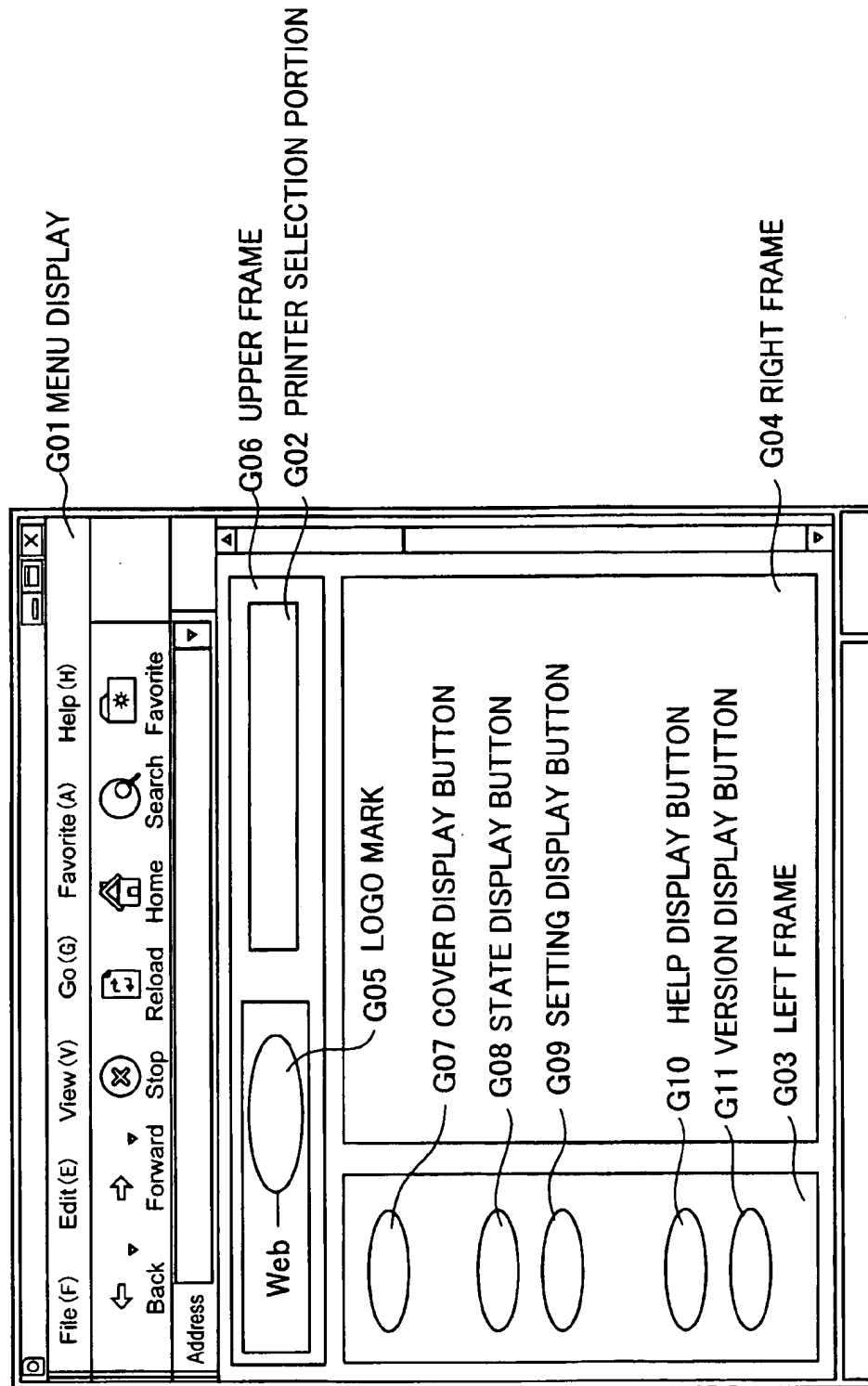


Fig.9

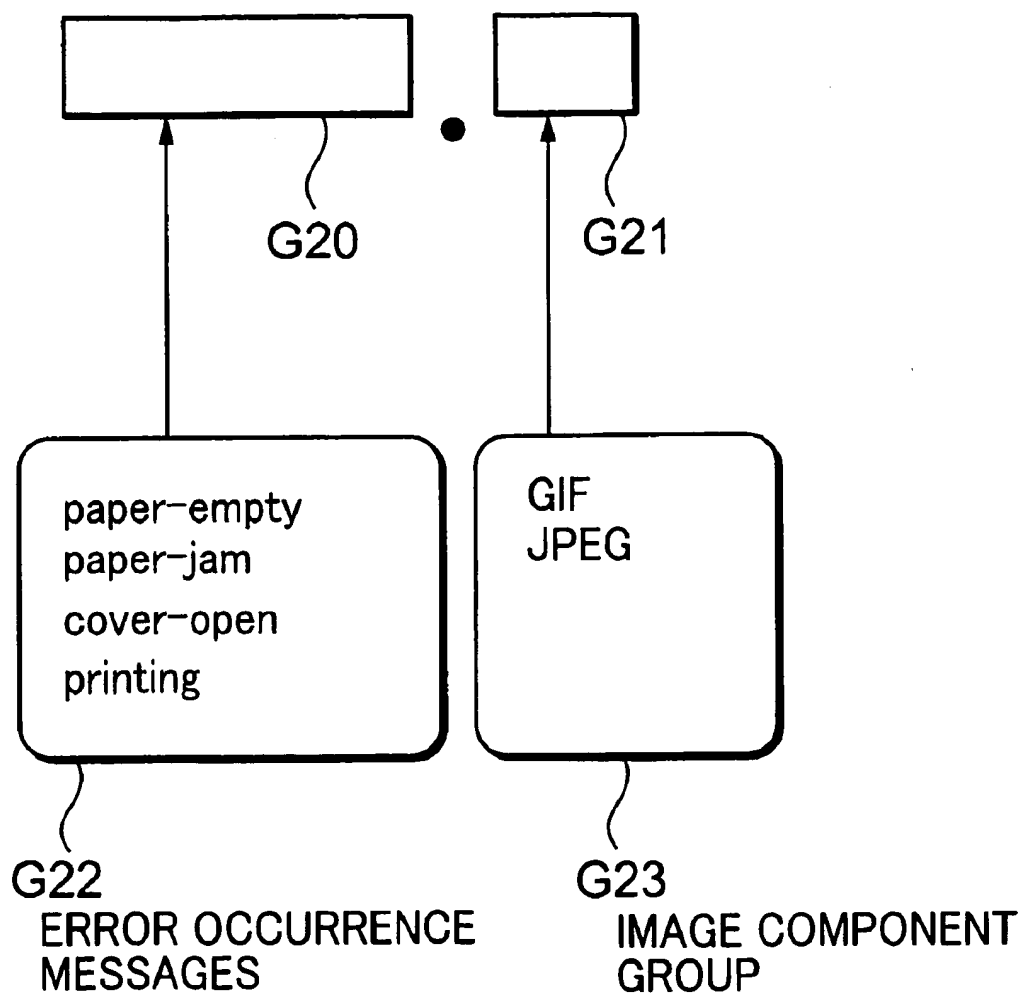
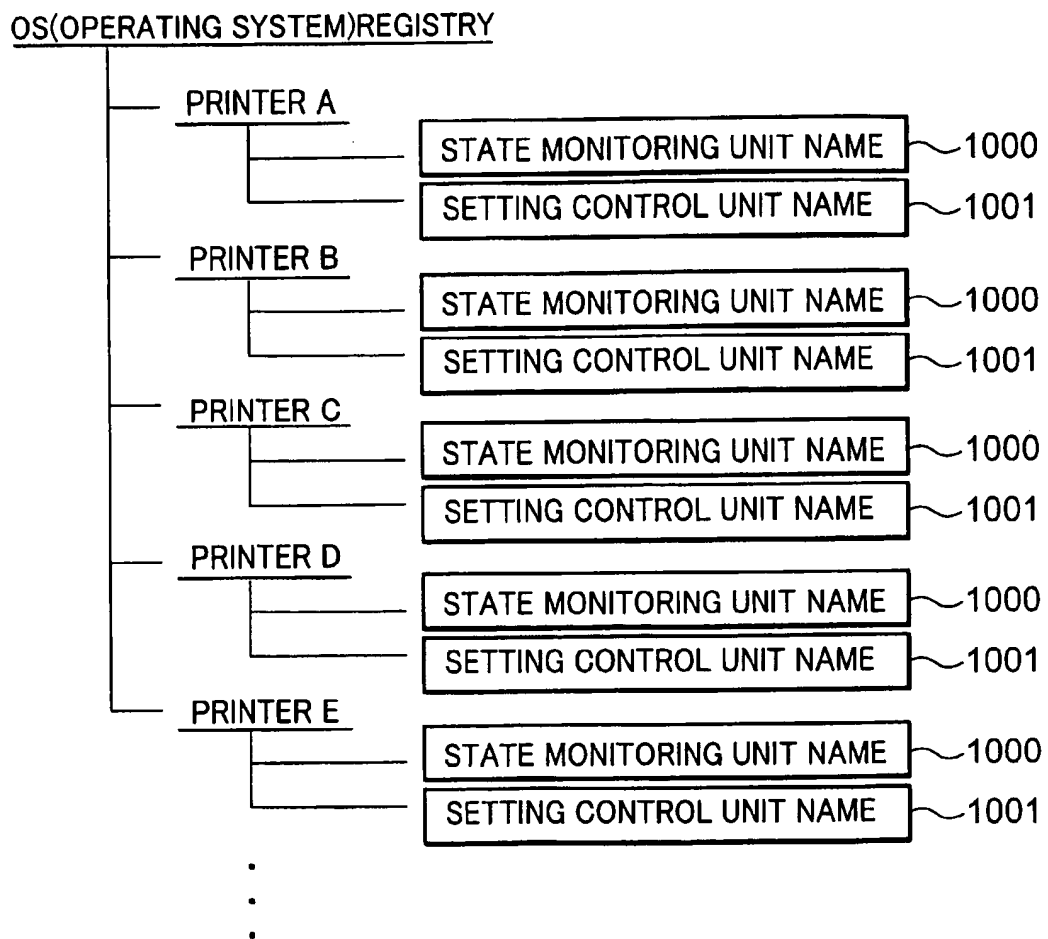


Fig.10



## PRINTER CONTROLLER

## BACKGROUND OF THE INVENTION

## (i) Field of the Invention

The present invention relates to a printer controller and a program recording medium recording a program in which the printer controller is embodied. Specifically, it relates to a printer controller installed for a printer which is connected to a network and a program recording medium recording the program in which the printer controller is embodied.

## (ii) Description of the Related Art

In recent years, to share software resources such as data and software or hardware resources such as a printer and a modem in the environment where a plurality of computers are used by many users, it is becoming general to form a network by connecting the computers to each other. Over such network, it is general to use printers and databases shared by host computers in the network, and in order to perform batch processing for printers and databases for requests from host computers, a computer called a server is installed. For example, when a plurality of host computers (hereinafter referred to as "clients") are used together with a printer, a printer server is installed. The printer server is a computer which provides the service sharing the printer and has the function of performing the operation setting and change of the printer setting in accordance with requests from the client.

Before the printer server is introduced, the operating state of a printer is displayed on a small liquid crystal panel mounted on the printer and the printer is also set with a small number of limited buttons mounted on the printer. However, the display of such a liquid crystal panel is exceedingly hard to see and such buttons are hard to use because of their bad operability. Moreover, if the printer is located at a site separated from the client, it is difficult for a user of the client machine to always identify the operation of the printer. To solve these problems, such a printer controller has been installed over a network up to this time, that can identify the printer operation from the client.

For example, as disclosed in the Japanese Patent Laid-Open Publication No. Hei 9-185472 and the Japanese Patent Laid-Open Publication No. Hei 9-311769, a user of the client is provided with the information about the operating state of the printer such as print status or error occurrence on the display window of a client machine in real time by using a GUI (graphical user interface). Similarly, it is able to set the operation of the printer in real time by using such GUI.

However, the prior art described above includes the following problems. If such GUI as described above is used over a network, a dedicated controller has to be installed in both the server and the client machines that are scheduled to use the printer including both the server and client machines. This is because the server and the client machines become able to mutually communicate with each other by installing dedicated controllers and perform the operation monitoring and setting of the printer. In particular, in a large-scale network environment, the workload of installing the dedicated controller in such machines is heavy.

Moreover, whenever a new printer is additionally installed in a network, such printer-dedicated controller must be installed in all the machines that are scheduled to use the printer, and the workload required for such installation work is also heavy.

## SUMMARY OF THE INVENTION

The present invention has been developed in consideration of the problems in the prior art described above, and

it can apply to the printer controller and a recording medium recording the program in which the printer controller is embodied.

An object of the present invention is to provide, in a printer installed in a network, a printer controller which can greatly reduce the workload during printer installation and a recording medium recording the program in which the printer controller is embodied.

Further, an object of the present invention is to provide a printer controller which can easily perform the operating state monitoring, check and instruction of the printer from a client and a recording medium recording the program in which the printer controller is embodied.

To solve the issues, the printer controller of the first invention according to this application is installed over a network to which a printer server, a client and a printer are connected. Further, the printer controller performs the communication between the client and printer via the printer server. Moreover, the printer server has the function of a web server and has the function of setting at least one or more of the operation monitoring, check and instruction of the printer by a client browser.

Accordingly, the operating state of such printer can immediately be identified when the operating state of such printer must be obtained on the client. Besides, when a new printer is installed, because the step of individually installing a dedicated controller which corresponds to the new printer is not required, the workload required for installing the printer in the network can greatly be reduced.

Further, the printer controller of the second invention according to this application is installed over a network to which a printer server, a client and a printer are connected. Further, the printer controller performs the communication between the client and printer via the printer server. Moreover, the printer server has the function of communicating with a browser and has the function of setting at least one or more of the operation monitoring, check and instruction of the printer by the client browser.

Accordingly, the operating state of such printer can immediately be identified when the operating state of such printer must be obtained on the client. Besides, when a new printer is installed, because the step of individually installing a dedicated controller which corresponds to the new printer is not required, the workload required for installing the printer in the network can greatly be reduced.

Furthermore, in the third invention according to this application, the printer controller of the above first invention further comprises a control unit for communicating with a printer server and a database. The database communicates with the control unit and manages the printer information sent from the printer in a batch. Further, the control unit receives the browser information sent from the client browser from the printer server and sends the operation setting request and/or change request of the printer to the database as needed.

Accordingly, for example, whenever a new printer is added to a network, because the environment of the control unit and the entire printer server need not be updated, the workload required for additionally installing the printer in the network can greatly be reduced. Besides, because the information about all the printers connected to the network can immediately be detected, the maintainability of the network can be improved.

Further, in the fourth invention according to this application, the printer controller of the above first invention further comprises a control unit for communicating with a

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printer server and a database. The database manages the printer information sent from the printer in a batch and the printer server are provided. Further, the control unit receives the printer information from the database and sends it to the printer server.

Accordingly, for example, whenever a new printer is additionally installed in a network, because the environment of the control unit and the entire printer server need not be updated, the workload required for additionally installing the printer in the network can greatly be reduced. Besides, because the information about all the printers connected to the network can immediately be detected, the maintainability of the network can be improved.

Furthermore, the fifth invention according to this application is the printer controller of the above first invention, wherein the printer information is displayed on a client browser.

Accordingly, because the operating state of the printer is displayed as an image formed using a graphical user interface, a user of the client machine can easily identify the operating state of the printer.

Besides, in the sixth invention according to this application, the printer controller of the above first invention further comprises a control unit comprises a state monitoring unit which obtains the operating state of a printer. And the printer controller further comprises a setting control unit which obtains the operation setting value of the printer from a database and updates the setting value as needed. Further, the setting control unit and the state monitoring unit are installed in the control unit independently of the database, respectively.

Accordingly, whenever a new printer is additionally installed in a network, because the environment of the control unit and the entire printer server need not be updated, the workload required for additionally installing the printer in the network can greatly be reduced.

Further, the seventh invention according to this application is the printer controller of the above sixth invention, wherein a setting control unit and/or a state monitoring unit is installed corresponding to a printer.

Accordingly, whenever a new printer is added to a network, the workload regarding the additional setting of the printer can be reduced. This is because the setting control unit and/or the state monitoring unit corresponding to the new printer may simply be installed and the environment of the control unit and the entire printer server need not be updated.

Furthermore, the eighth invention according to this application is the printer controller of the above sixth invention, wherein a setting control unit has a polling setting control means which executes polling every fixed time.

Therefore, the operating state of the printer is automatically updated when a preset, predetermined time elapses. Accordingly, because a user need not perform any update procedure on purpose, the workload of a user of the client machine can be reduced.

Besides, the ninth invention according to this application is the printer controller of the above sixth invention, wherein a setting control unit has a polling setting control means which executes polling every fixed time.

Therefore, the operating state of the printer is automatically settled when a preset, predetermined time elapses. Accordingly, because a user need not perform any update procedure on purpose, the workload of a user of the client machine can be reduced.

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Further, in the tenth invention according to this application, the state monitoring unit of the above sixth invention has an image data unit for generating an image file. Therefore, an appropriate and detailed image corresponding to a printer can be provided.

Furthermore, the 11th invention according to this application is a storage medium recording a program and a recording medium recording the program, wherein the printer controller of the above first invention according to this application is embodied.

Accordingly, when such program is recorded in the recording medium, the printer controller can easily be installed in the printer server even if such program becomes a high-capacity one.

The present invention attains the objects described above by each of these means.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram showing the configuration of the printer controller according to the first embodiment of the present invention.

FIG. 2 is a flowchart showing the function of the control unit installed in the printer controller according to the first embodiment of the present invention.

FIG. 3 is a flowchart showing the function of the state monitoring unit installed in the printer controller according to the first embodiment of the present invention.

FIG. 4 is a flowchart showing the function of the setting control unit installed in the printer controller according to the first embodiment of the present invention.

FIG. 5 is a block diagram showing the configuration of the printer controller according to the second embodiment of the present invention.

FIG. 6 is a flowchart showing the function of the state monitoring unit installed in the printer controller according to the second embodiment of the present invention.

FIG. 7 is a flowchart showing the function of the control unit installed in the printer controller according to the second embodiment of the present invention.

FIG. 8 is a diagram showing an example of the screen image displayed on the browser which operates on the client display window in the control printer according to the first and second embodiments of the present invention.

FIG. 9 is a diagram showing error messages which correspond to the error information when an error occurs and an example of the image name used at that time in the state monitoring unit installed in the printer controller according to the first and second embodiments of the present invention.

FIG. 10 is a diagram showing an example of the plug-in information inside the printer server in the printer controller according to the first and second embodiments of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The embodiments of the present invention are described below with reference to the drawings, but each of the following embodiments is only an example showing a printer controller according to the present invention and a recording medium recording the program in which the printer controller is embodied.

(First Embodiment)

The printer controller according to this embodiment is connected to a network to which host computer machines

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(hereinafter referred to as "clients") are connected and operates on a printer server machine (hereinafter referred to as a "printer server") which connects a single network shared printer or a plurality of network shared printers enabling bidirectional communication to a local port.

FIG. 1 is a block diagram showing the configuration of the printer controller according to the first embodiment of the present invention.

Two printers A9 and B10 are connected to the local port of the printer server and function as a network shared printer. A language monitor 7 for a printer A and a monitor 8 for a printer B are installed in the printer server corresponding to the printers A9 and B10, respectively. The language monitor 7 for the printer A and the language monitor 8 for the printer B are language monitors exclusively used for the printers A and B, respectively. Each language monitor performs communication with its corresponding printer and records the operating state (usually, paper-empty, paper-jam or power off) of each printer in a printer information database 6 each time communication is performed. Further, the operation setting state (for example, operation mode, power saving function or setting of a paper feed or ejection destination) of the printer instructed from a client according to the method described later is also recorded in the printer information database 6. The language monitor 7 for the printer A and the monitor 8 for the printer B perform the internal operation setting of each corresponding printer based on the setting state recorded in the printer information database 6.

A main control unit 1 is the main controller which communicates with a web server unit 11 on the printer server described later and the printer information database 6. The main control unit 1 sends the operating and setting states of each printer recorded in the printer information database 6 to a client based on the request received from the client via the web server unit 11.

Hereupon, the printer server according to the present invention is characterized in that it is provided with the function as a web server, and the client according to the present invention is characterized in that it is provided with a browser 12. Besides, no dedicated controllers need be installed on the client and the environment where the browser 12 operates, may be acceptable.

The client browser 12 generates a URL (universal resource locator) indicating the site of the information whose acquisition is requested based on the operation of a user. The URL is sent from the client to the printer server via a network. When the printer server generates the home page data containing the information about the state of the printer corresponding to the URL and sends it to the client, an image indicating the state of the printer is displayed on the client.

This image displays the operating and setting states of each printer and contains an image which a user uses to instruct the setting change of the printer. In accordance with the operation which the user performs by using this image on the client display, the URL which corresponds to the operation is sent from the browser 12 to the printer server. For example, by aligning the cursor displayed on the image to the position of the icon displayed on the image using the mouse and pressing the mouse button, the URL which corresponds to the operation is sent from the browser 12 to the printer server. The transmission of the URL allows the browser 12 to request acquisition of the image which displays the setting state after the setting is instructed, and also, the transmission of the URL allows the browser 12 to instruct the setting of the printer.

The main control unit 1 receives the URL indicating the request of the information about the operating state of the

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printer from the browser 12 which operates on a client via the web server unit 11. Then, it calls a state monitoring unit 3 of the corresponding printer recognized with reference to a registry. The state monitoring unit 3 obtains the operating state of the corresponding printer based on the URL with reference to the printer information database 6 and generates a necessary HTML file group.

Similarly, when the main control unit 1 receives the URL indicating the request of the specification, operation setting or operation update of the printer from the client browser 12, it calls a corresponding setting control unit 2. The setting control unit 2 detects the request of the specification or update of the setting state of the printer which corresponds to the printer information database 6 from the URL. The setting control unit 2 records the setting required for the printer information database 6, obtains other setting states and generates a necessary HTML file group.

The main control unit 1 manages the file group required for generating and display an image on a client as an image component group 4 and an HTML file group 5. When a request is issued from the browser 12, the main control unit generates the file group corresponding to a URL and transfers it to the web server unit 11. The web server unit 11 sends the transferred file group to the browser requested via a network. The browser 12 receives the transmitted file group, displays the operating and setting states of a desired printer based on the file group, and displays an image which a user uses to instruct the setting change of the printer.

The image displaying the operating and setting states of the printer is comprised by combining a plurality of frames which are partial images. For example, the basic frame which comprises the image of the title portion or the entire frame and the operation state display and setting state display frames which comprise the image of each portion arranged in the basic frame are provided. The basic frame and a partial frame which comprises the image of each portion are created based on a separate HTML file and the partial frame is arranged in the basic frame based on the HTML file commands of the basic frame. The HTML file group 5 consists of HTML files of these basic and partial frames. Further, the image component group 4 consists of image files required for generating an image arranged in each frame based on these HTML file commands.

Moreover, a URL is created in accordance with a predetermined description format called an interface including arguments which correspond to the HTML file and image component of each partial image whose acquisition is requested. The setting control unit 2 and the state monitoring unit 3 analyze the URL received from the main control unit 1 and the client browser 12 and generate the HTML file and image component of the requested individual partial image.

Further, depending on the type of a printer to be supported, the information about the operating and setting states of the printer differs. For example, the setting regarding the operations of options such as sorters (there are many steps of sorters which enable sorting and output BIN specification) and finishers (highly functional ejectors such as a stapler, punch, and folder) differ depending on types. Furthermore, the setting parameters regarding the control of an engine which is the mechanical-unit controller of the printer such as control of print density also differ depending on types. Besides, depending on the difference in the printer option configuration, difference in the engine and difference in the printing speed performance, the data received on state monitoring differs. Accordingly, the setting control unit 2 and the state monitoring unit 3 are created according to the

type of the printer. Moreover, the image component group 4 and the HTML file group 5 for generating a frame which depends on the type of the printer are also prepared every printer types.

The OS (operating system) of a printer server has a setting value storage portion called a registry. A printer name and its corresponding state monitoring and setting control unit names are written in the registry of the printer server as plug-in information. The main control unit 1 checks the registry and recognizes these file names which correspond to the printer to be connected each time it is activated.

When the main control unit 1 receives the URL indicating the request of the operating state of the printer from the browser 12 which operates on a client via the web server unit 11, it calls the state monitoring unit 3 of the corresponding printer with reference to the registry. The state monitoring unit 3 obtains the operating state of the corresponding printer based on the URL with reference to the printer information database 6 and generates a necessary HTML file group.

Similarly, when the main control unit 1 receives the URL indicating the request of the specification, operation setting or operation update of the printer from the client browser 12, it calls the corresponding setting control unit 2 with reference to the registry. The setting control unit 2 detects the request of the specification or update of the setting state of the printer which corresponds to the URL and performs recording of the requested setting for the printer information database 6. The setting control unit 2 obtains other setting states along with this. Then it generates a necessary HTML file group corresponding to the setting states.

If a type of a printer is needed to be added, the state control unit 2 and the state monitoring unit 3 are added to the printer server. Further, the image component group 4 and the HTML file group 5 for generating a frame which depends on the type of the printer are added to the printer server, too. And the printer name of the added printer and the names of its corresponding state monitoring and setting control unit are added to the registry of the printer server.

Because the main control unit checks its registry write site each time it is activated, it can recognize these file names which correspond to the added printer and can call the state monitoring unit or setting control unit having its file name.

Next, the operation of the printer controller of the present invention is described with reference to its flowchart and screen image.

FIG. 2 is a flowchart showing the function of the main control unit 1 installed in the printer controller according to one embodiment of the present invention.

FIG. 8 is a diagram showing an example of the screen image displayed on the browser 12 which operates on the client display window in the printer controller according to one embodiment of the present invention.

FIG. 10 is a diagram showing an example of the plug-in information inside the printer server in the printer controller according to one embodiment of the present invention.

When a URL from the browser is received and the main control unit 1 is called from the web server unit 11 and activated, frame initialization is performed (Step S21). When the preparation work such as the setting of internal information or work area used in this step, the HTML file group and the image component group of the basic frame are generated (Step S22).

Subsequently, the main control unit 1 generates the HTML file group and image component group of a left

frame G03, a right frame G04 and an upper frame G06 which are the basic frames displayed by the browser 12. It generates the HTML file group and image component group which display a logo mark G05 on the upper frame G06. It generates the HTML file group and image component group which arrange a cover display button G07, a state display button G08, a setting display button G09, a help display button G10 and a version display button G11 on the left frame G03. It generates the HTML file group and image component group which display the cover as an initial state on the left frame G04. When the generation of the HTML file group and image component group of the basic frame is completed, the OS of the printer server executes retrieval of the printer to be supported (Step S23). This retrieval method obtains a list of printers using an open interface and, based on the list, compares it with the plug-in information written in the data area called a registry and decides it when each printer is additionally installed in a network.

An example regarding the plug-in information is shown in FIG. 10. As shown in FIG. 10, a state monitoring unit name 1000 given corresponding to the name of each printer and a setting control unit name 1001 given corresponding to the name of each setting control unit are recorded in a predetermined site.

The name of the retrieved printer is displayed as a list on the printer selection portion G02 so that client users can specify the printer they use. When whether a printer is specified by a user is judged (Step S24) and that it is specified is detected, the decided printer is recorded (Step S210) and Step S23 is returned.

If no printer is specified, whether there is the operation of cover display by a user is judged (Step S25). When the operation of cover display is detected, the cover is displayed on the right frame G04 (Step S211) and Step S23 is returned. If the operation of cover display is not detected, whether there is the operation of printer state display by the user is judged (Step S26). When the operation of printer state display is detected, by referring to the registry which corresponds to the recorded printer, the specified state monitoring unit 3 is called. The state display processing of the printer is performed. The operating state of the printer is displayed on the right frame G04 portion (Step S212) and Step S23 is returned.

If the operation of the printer state display is not detected, whether there is the operation of printer setting display is judged (Step S27). When the operation of printer setting display is detected, the setting control unit 2 for the printer operation is called, the setting display is performed on the right frame G04, the operation change processing of the printer is performed (Step S213) and Step S23 is returned.

Further, if there is no operation of printer setting display, whether there is no operation of help display is judged (Step S28). When the operation of help display is detected, the help display is performed, the help in which the use method and the link information into a related site is displayed on the right frame G04 (Step S214) and Step S23 is returned.

If the operation of help display is not detected, whether the display operation of the version information is judged (Step S29). When the display operation of the version information is detected, a version and a copyright are displayed on the right frame G04 (Step S215) and Step S23 is returned.

If the display operation of the version information is not detected, Step S23 is returned as is.

Next, the operation of the state monitoring unit 3 which performs the state display processing of the printer (Step S212) in FIG. 2 is described referring to the flowchart of FIG. 3.

FIG. 3 is a flowchart showing the function of the monitoring unit 3 installed in the printer controller according one embodiment of the present invention.

FIG. 9 is a diagram showing an example of error occurrence messages which corresponds to the error information when an error occurs and the image component group used at that time in the state monitoring unit 3 installed in the printer controller according to one embodiment of the present invention.

The state monitoring unit 3, as shown in FIG. 3, first makes the browser 12 perform the initial display processing of the right frame G4 (Step S30). Then, with reference to the printer information database 6 which manages the printer information, the state of the relevant printer is retrieved (Step S31). When whether an error is occurring is judged (Step S32) and the error occurs, the corresponding error ID is checked (Step S35) and error occurrence messages and an image are displayed on the browser 12 as error information (Step S36). For the image, the image component group 4 prepared for displaying the error occurrence is used. At that time, the file name of the corresponding file, for example, as shown in FIG. 9, consists of error occurrence messages G22 which corresponds to the error information when an error occurs and an extension G23 indicating the data format of the image component group. Conversely, if no error is occurring, the ID indicating a normal state is checked (Step S33) and the message indicating the normal state and the image are displayed on the browser 12 (Step S34). Then, using a general-purpose interface, the current time is obtained and displayed on the browser 12 as the printer information acquisition time (Step S37). Subsequently, accessory data such as configuration information is obtained and displayed (Steps S38 and S39). Further, when the state acquisition button of the printer on the same frame is monitored and that a user who uses a client performs the operation regarding the printer operation is detected, the printer information about the printer operation is updated with reference to the printer information database 6.

Then, the operation of the setting control unit 2 which performs the operation setting change processing of the printer (Step S213) in FIG. 2 is described referring to the flowchart of FIG. 4.

FIG. 4 is a flowchart showing the operation of the setting control unit 2 installed in the printer controller according to one embodiment of the present invention.

The setting control unit 2, as shown in FIG. 4, first makes the browser perform the initial display processing of the right frame G4 (Step S40). Then, with reference to the printer information database 6 (shown in FIG. 1) which manages the printer information, the state of the pertinent printer is retrieved and the setting information of the printer obtained from such retrieval is displayed (Step S42). Using a general-purpose interface, the current time is obtained and displayed as the printer information acquisition time (Step S43). Next, accessory data such as configuration information is obtained and displayed (Steps S44 and 45). Subsequently, when the operation of pressing the setting update button arranged on the same frame is detected, the contents of the setting items of the printer which are changing are sent to the printer information database 6 and the setting of the printer is updated (Steps S46 and S47). Moreover, when a user who uses a client detects that the initial setting value setting button is pressed, an initial setting value is displayed on the browser (Steps S48 and 49). Subsequently, when the operation setting acquisition button of the printer arranged on the same frame is monitored and that the user performs the

operation is detected, the printer operation display information is updated with reference to the printer information database 6 (Step S410).

Furthermore, the printer controller according to the embodiment of the present invention is embodied as a program and such program can be recorded in a recording medium. The storage medium storing such program may be acceptable if it can store the program in which the printer controller of the present invention is embodied. For example, a floppy disc, CD-ROM, CD-RW, DVD-ROM, DVD-R, DVD-RAM, PD, magneto-optical disk, high-speed magnetic tape, magnetic tape, Zip drive and super disc are listed.

According to the printer controller described above, such printer controller allows a printer server to be provided with the function of a web server which performs communication with a browser via a network. Further, such printer controller allows a printer server to be provided with the function of performing the operation monitoring, check and/or instruction of the printer A9 and/or printer B10 connected to the printer server with reference to a URL sent from the browser. Accordingly, when the operating state of such printer must be known on a client, the operating state of such printer can immediately be identified.

Besides, when a new printer is installed, because the step of individually installing the dedicated controller which corresponds to the new printer in each client is not needed, the workload required for installing the printer in a network can greatly be reduced.

Further, the main control unit 1 for communicating with a printer server and the printer information database 6 which manages in a batch the printer information sent from all printers connected to the main control unit 1 are provided. The main control unit 1 receives the browser information sent from the client browser 12 from the web server unit 11. The main control unit 1 send the printer operation setting request and/or change request to the printer information database 6 as needed. Accordingly, whenever a new printer is added to the network, because the workload of updating the environment of the entire printer server is not needed, the workload required for additionally installing in the network can greatly be reduced. Moreover, because all the printer information connected to the network can immediately be detected, the maintainability of the network can be improved.

Furthermore, because the operating state of the printer is displayed as an image created using a graphical user interface by displaying the printer information on the client browser 12, a user who uses a client machine can easily identify the operating state of the printer.

Besides, the main control unit 1 comprises the state monitoring unit 3 which obtains the operating state of a printer and the setting control unit 2 which obtains the operation setting value of the printer from the printer information database 6 and updates the setting value as needed. The setting control unit 2 and the state monitoring unit 3 are installed in the main control unit 1 independently if of the printer information database 6, respectively. Accordingly, whenever a new printer is added to a network, because the environment of the control unit and the entire printer server need not be updated, the workload required for additionally installing the printer in the network can greatly be reduced.

Besides, the setting control unit 2 and/or the state monitoring unit 3 is installed corresponding to the printer. Accordingly, whenever a new printer is added to the network, the workload regarding the additional setting of the



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printer can be reduced. This is because the setting control unit 2 and/or the state monitoring unit 3 which corresponds to the new printer is simply be installed and the environment of the main control unit 1 and the entire printer server 11 need not be updated.

Further, when the program in which the printer controller according to this embodiment is embodied is recorded in a recording medium, the program can easily be installed in a printer server even if such program becomes a high-capacity one.

## (Second Embodiment)

Next, the printer controller according to another embodiment of the present invention is shown. Because the printer controller according to the present invention has the same function of the printer controller according to the embodiment of the present invention described above except the points described later, the same description as that described above is omitted.

FIG. 5 is a block diagram showing the configuration of the printer controller according to one embodiment of the present invention.

FIG. 6 is a flowchart showing the function of the state monitoring unit installed in the printer controller according to one embodiment of the present invention.

FIG. 7 is a flowchart showing the function of the setting control unit installed in the printer controller according to one embodiment of the present invention.

FIG. 5 is a block diagram showing the configuration of the printer controller according to one embodiment of the present invention. The printer controller shown in FIG. 5 and the printer controller shown in FIG. 1 have two differences. The first difference is in that an image component 54 is attached to each state monitoring unit 3. The second difference is in that a printer installed over a network is also contained in the printer managed by the printer information database 6. When image data is attached to each state monitoring unit 3, a main control unit 51 increases in its capacity. However, because the image which matches the type of a printer can be provided, a printer server 511 can be provided with an appropriate and detailed image.

Next, the function of a state monitoring unit 53 of the printer controller according to another embodiment of the present invention shown in FIG. 5 is shown in FIG. 6.

The state monitoring unit 53 of the printer controller according to the embodiment of the present invention shown in FIG. 1 described above implements acquisition of printer information by a regular polling state monitoring means. As shown in FIG. 6, Step S611 judges the execution of polling. Care must be taken of the operation because a load applies to a network depending on the time setting of polling intervals. However, even if the state acquisition button is not pressed, because the printer operating state is updated, the workload of a user who uses a client can be reduced. Moreover, such a polling state monitoring means uses a timer. Such timer executes the polling state monitoring means by using an OS standard open interface.

Next, the function of a setting control unit 52 of the printer controller according to another embodiment of the present invention shown in FIG. 5 is shown in FIG. 7.

The state monitoring unit of the printer controller according to the embodiment of the present invention shown in FIG. 1 described above implements acquisition of the printer information by the regular polling state monitoring means. As shown in FIG. 7, Step S711 judges the execution of polling. Care must be taken of the operation because a load

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applies to a network depending on the time setting of polling intervals. However, even if the state acquisition button is not pressed, because the printer operating state is updated, the workload of a user who uses a client can be reduced. Moreover, such a polling state monitoring means uses a timer. Such timer executes the polling state monitoring means by using an OS standard open interface.

According to the printer controller described above, the setting control unit 2 has the polling setting control means which executes polling every fixed time and, therefore, when a preset, predetermined time elapses, the printer operating state will automatically be updated. Accordingly, because a user need not perform a update procedure on purpose, the workload of a client machine user can be reduced.

Further, the setting control unit 3 has the polling setting control means which executes polling every fixed time and, therefore, when a preset, predetermined time elapses, the printer operating state will automatically be settled. Accordingly, because a user need not perform a update procedure, the workload of a user of the client machine can be reduced.

Furthermore, because the state monitoring unit 3 has the image component 54 which is an image data unit for creating an image file, an appropriate and detailed image which corresponds to the printer can be provided.

The printer controller of the present invention is installed over a network to which a printer server, a client and a printer are connected. The printer controller performs the communication between the client and printer via the printer server. the printer server has the function of a web server and the function of setting at least one or more of the operation monitoring, check, and instruction of the printer, and, therefore, the printer operating state can immediately be identified when the printer operating state must be obtained on the client. Besides, because the step of individually installing the dedicated controller which corresponds to the printer used in the network in each client which is scheduled to use such printer is not needed, the workload required for installing the printer in the network can greatly be reduced.

What is claimed is:

1. A printer controller for a printer server in communication with a network, a client and a printer, the printer controller comprising:

- a control unit for controlling the printer server;
- a web server in communication with said control unit; and
- a database in communication with said control unit and for storing printer information received from said printer in a batch, wherein said control unit includes:
  - a state monitoring unit which is adapted to obtain an operating state of said printer;
  - a setting control unit which is adapted to obtain an operation setting value of the printer and to update a setting value, wherein at least one of the state monitoring unit and the setting control unit includes a polling monitor which executes a poll every fixed time; and
  - an updating unit which makes the updating operation of at least one of the state monitoring unit and the setting control unit possible by executing an operation for updating even before a predetermined period of time elapses from previous polling.

2. The printer controller of claim 1, wherein the control unit receives browser information sent from a client browser and an operation setting request and/or change request of the printer is sent to the database as needed.

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3. The printer controller of claim 1, wherein the control unit receives printer information from the database.

4. The printer controller of claim 1, wherein the printer information is forwarded to a client browser for display.

5. The printer controller according to claim 2, wherein said setting control unit and the state monitoring unit are installed in the printer server independently of the database, respectively.

6. The printer controller according to claim 5, wherein the setting control unit and/or the state monitoring unit is installed corresponding to the printer.

7. The printer controller according to claim 5, wherein the state monitoring unit has an image data unit for creating an image file.

8. A storage medium recording a program, and a recording medium recording the program in which the printer controller of claim 1 is embodied.

9. A printer controller for a printer server in communication with a network, a client with a browser and a printer, the printer controller comprising:

- a control unit for controlling the printer server;
- a web server in communication with said control unit and said browser; and
- a database in communication with said control unit and for storing printer information received from said printer in a batch, wherein said control unit includes:
  - a state monitoring unit which is adapted to obtain an operating state of said printer;
  - a setting control unit which is adapted to obtain an operation setting value of the printer and to update a setting value, wherein at least one of the state monitoring unit and the setting control unit includes a polling monitor which executes a poll every fixed time; and
- an updating unit which makes the updating operation of at least one of the state monitoring unit and the setting control unit possible by executing an operation for updating even before a predetermined period of time elapses from previous polling.

10. A printer controller for a printer server in communication with a network, a client and a shared printer, the printer controller comprising:

- a control unit for controlling the printer server;
- a web server in communication with said control unit and said client through said network and adapted to receive a request from said client; and
- a database in communication with said control unit wherein said control unit includes:
  - a state monitoring unit which is adapted to obtain an operating state of said shared printer in response to said request therefor;
  - a setting control unit which is adapted to obtain an operation setting value of said shared printer in response to said request therefor and to update a setting value, wherein at least one of the state monitoring unit and the setting control unit includes a polling monitor which executes a poll every fixed time; and

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an updating unit which makes the updating operation of at least one of the state monitoring unit and the setting control unit possible by executing an operation for updating even before a predetermined period of time elapses from previous polling.

11. A printer controller for a printer server in communication with a network, a client having a browser and a shared printer, the printer controller comprising:

- a control unit for controlling the printer server;
- a web server in communication with said control unit and said client through said network, wherein said web server is adapted to receive a request from said browser and to send home page data containing information about said shared printer in response to a request therefor; and
- a database in communication with said control unit wherein said control unit includes:
  - a state monitoring unit which is adapted to obtain an operating state of said printer in response to said request;
  - a setting control unit which is adapted to obtain an operation setting value of the printer in response to said request and to update a setting value, wherein at least one of the state monitoring unit and the setting control unit includes a polling monitor which executes a poll every fixed time; and
- an updating unit which makes the updating operation of at least one of the state monitoring unit and the setting control unit possible by executing an operation for updating even before a predetermined period of time elapses from previous polling.

12. The printer controller of claim 11, wherein said control unit is adapted to receive an operation setting request and/or operation setting change request of said shared printer sent from said client browser from said web server unit and to send said operation setting request and/or operation setting change request to said database based on said request thereof.

13. The printer controller of claim 11, wherein:

said setting control unit and said state monitoring unit are installed in said control unit independently of the database, respectively.

14. The printer controller according to claim 13, wherein said setting control unit and/or said state monitoring unit is installed corresponding to each printer, respectively.

15. The printer controller of claim 13, wherein said setting control unit is adapted to record a setting state in the database.

16. The printer controller of claim 13, wherein said state monitoring unit is adapted to record the operation state in the database.

17. The printer controller of claim 13, wherein said state monitoring unit includes an image data unit for creating the image file.

\* \* \* \* \*



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**Gadd**

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(54) **STOCK CONTROL COMPUTER SYSTEM  
AND METHOD**

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(52) **U.S. Cl.** ..... **235/383; 235/385; 705/28**

(58) **Field of Search** ..... **235/383, 376,  
235/385; 705/22, 23, 26, 28**

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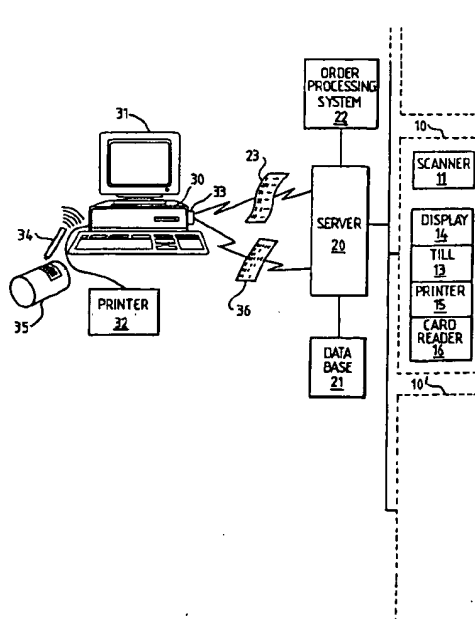
*Primary Examiner*—Diane I. Lee

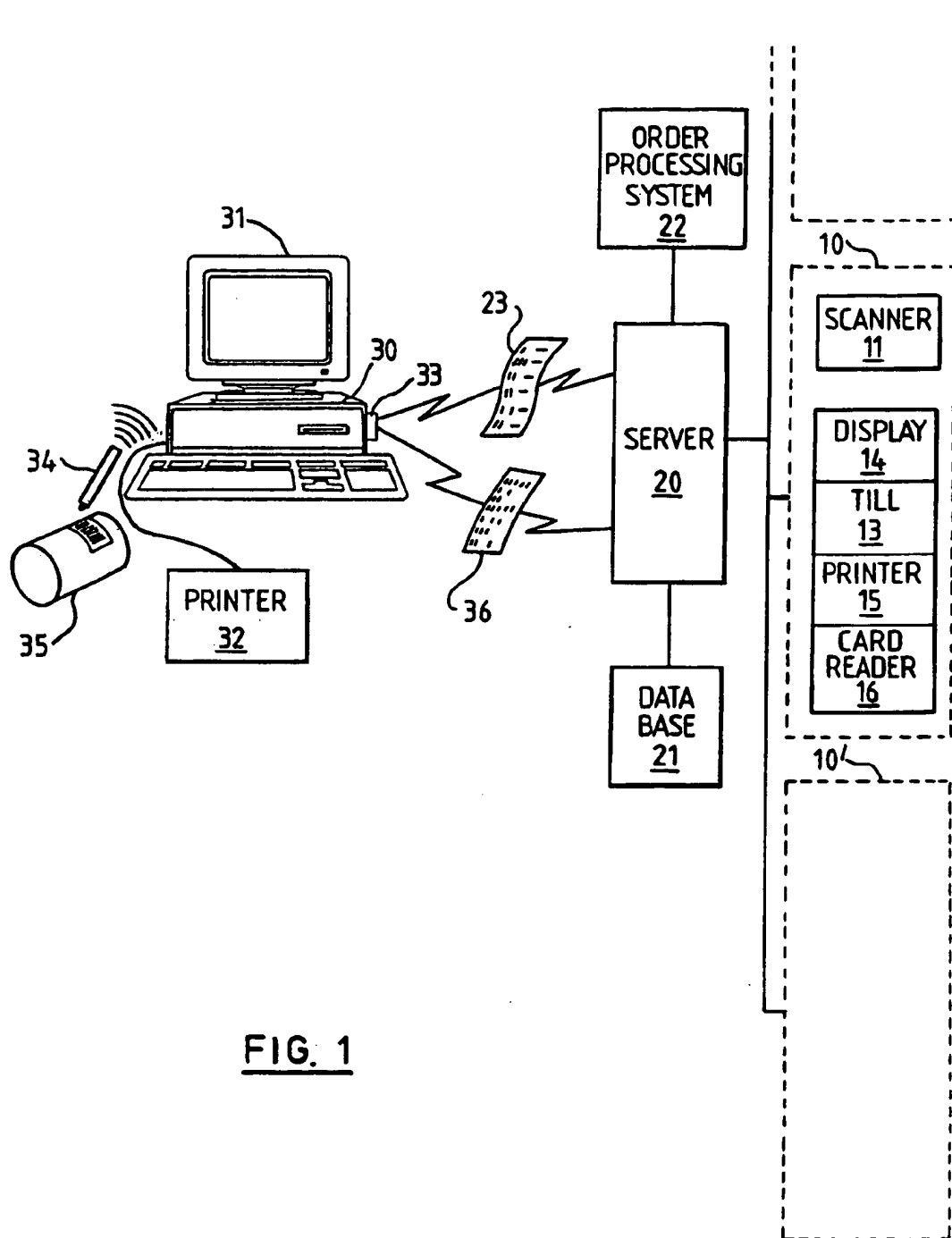
(74) *Attorney, Agent, or Firm*—Louis J. Percello

(57) **ABSTRACT**

A stock control computer system includes a memory for storing a current stock list based on product codes. An electronic version of a store purchase receipt, including product codes for the items purchased, is sent from the store to the customer's home computer where it is used to update the current stock list by addition of products purchased. Items are deleted from the current stock list as they are disposed of by the customer, in response to an electronic indication of the corresponding product codes produced, for example, by scanning product packaging with a bar code scanner. When the customer initiates a home stock check, the current stock list is compared with a predetermined stock level and an indication of which items need replacement is produced. This indication may be displayed, printed or transmitted electronically to the store. The electronic purchase receipt may also be used to generate and update a correlation between product codes, such as bar codes, and product descriptions, this correlation also being stored in memory.

**12 Claims, 3 Drawing Sheets**



FIG. 1

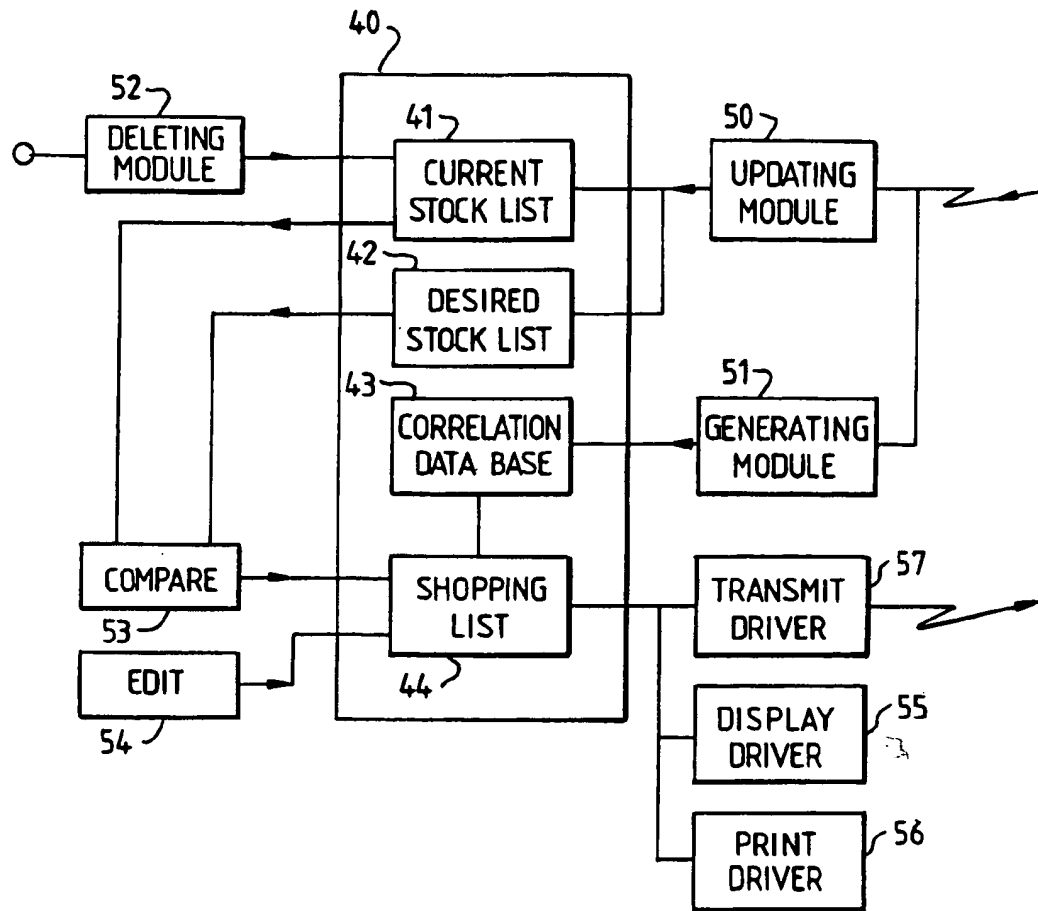
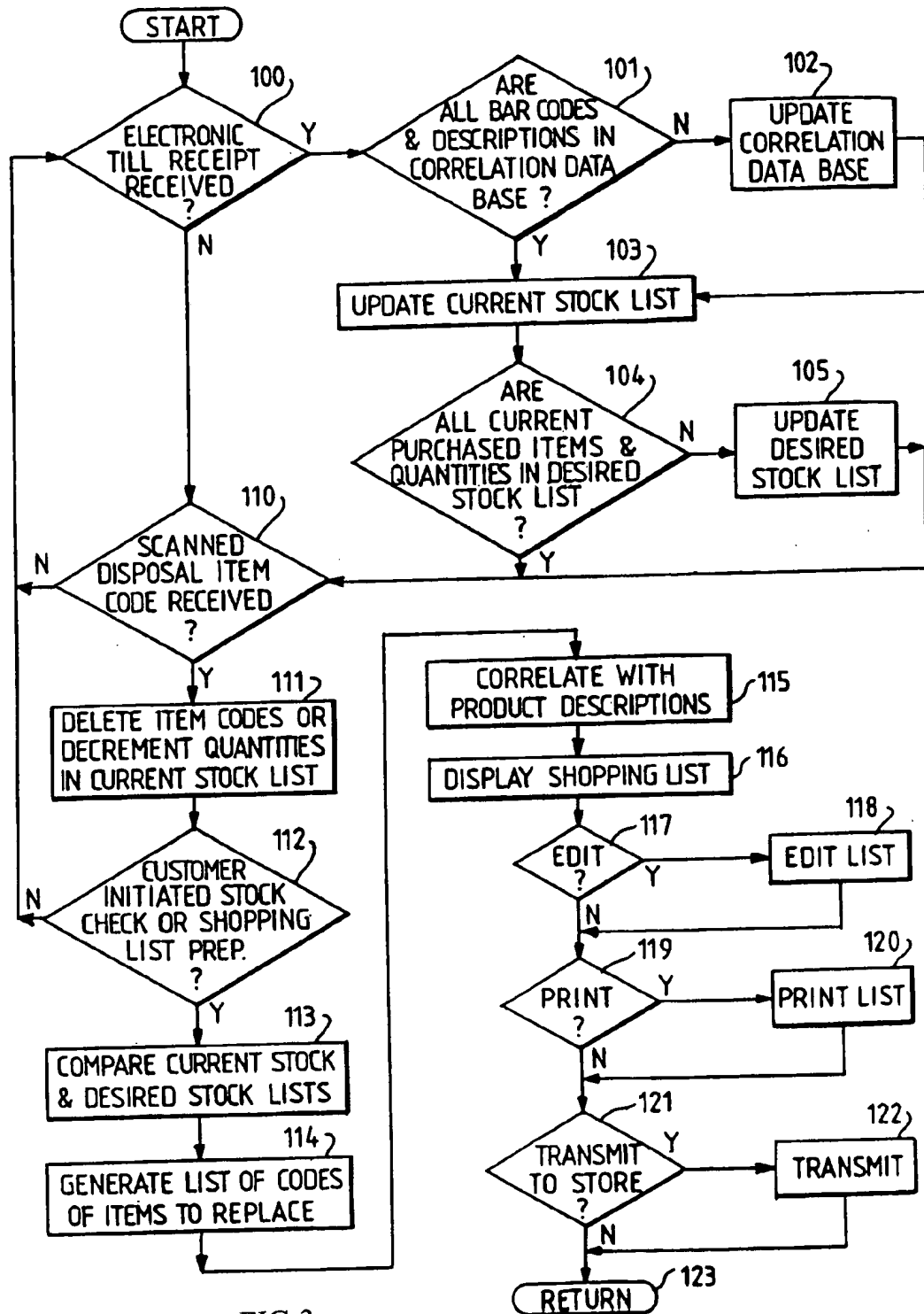


FIG. 2



# STOCK CONTROL COMPUTER SYSTEM AND METHOD

## BACKGROUND OF THE INVENTION

The invention relates to a computer system, computer program and method for stock control. In particular, but without limitation thereto, the invention relates to stock control, in the home, of everyday household items.

The use of electronics and computing in the field of retail shopping, particularly food shopping, has become widespread in recent years. In addition to the scanning of product bar codes at electronic checkout stations, supermarket chains have introduced facilities for personal hand-held scanners for shoppers to scan articles as they pick them from the shelves and to store a record of the articles to be purchased. When the shopper reaches the checkout, the contents of the shopping trolley can be automatically read into the store's computer system from the scanner, allowing immediate display of a description and price of each article purchased and, after payment, printing of a till (cash register) receipt. In this way, faster progress of customers through the checkouts is facilitated.

Supermarket chains have also made use of the Internet to allow customers with home computers and Internet connection to generate an electronic shopping list (or order) by selection from a displayed catalogue of the supermarket's goods. This list can be sent electronically to the supermarket and the purchases assembled by the supermarket staff for collection or delivery to the customer's home.

Examples of known electronic shopping technology include U.S. Pat. No. 5,047,614 (Bianco) entitled "Method and Apparatus for Computer-Aided Shopping". This patent describes how a shopping list can be generated manually by a customer with a home computer and bar code scanner from (a) preprinted lists, provided by the supermarket, which correlate bar codes and product descriptions, (b) bar codes on discarded items and (c) discount coupons containing bar codes. The list may then be printed, stored on a smart card or read out from the scanner's memory when the customer visits the store.

U.S. Pat. No. 5,250,789 (Johnson) entitled "Shopping Cart" employs a cart mounted shopping system including a scanner, a display and wireless communication with a store computer. A shopping list may be prepared by scanning bar codes from a catalogue or an old cash register tape (till receipt) which includes bar codes. The shopper is then guided around the store in the order in which items on the list are stocked and is advised of promotions as they reach them.

Published International patent application WO 98/18094 (Eldat Communication Limited) entitled "Personal Shopping System" shows a system of great complexity involving in-store transmission of prices to electronic display labels and a hand-held personal shopper device with display and keypad. One aspect of this system is the maintenance and updating of a "customer shopping profile" in a memory of the hand-held device. A "purchase record" containing item names, quantities and numeric codes is built up during shopping and used to facilitate checkout and also as a basis for updating the contents of the profile memory. Before shopping, the customer uses the customer profile and other information, say about discounts, to create a shopping list which is then stored in the shopper device and which interacts with the store's central computer to signal that the customer is near an item on the list by causing a light on a product price display to blink.

All the above are concerned with in-store technology. One patent which is concerned more with the domestic end is U.S. Pat. No. 5,691,684 (Murrell) entitled "Article Storage Container with Bar Code Scanning". This shows a container such as a refrigerator or pantry with dual in-built bar code scanners for sensing insertion or removal of products. The information can be used by an associated home computer system to generate printed inventories or shopping lists on request. The inventory is effectively the list of products placed in the container minus those removed.

## SUMMARY OF THE INVENTION

None of the above prior art shows a rapid and convenient way of updating the inventory of products, enabling the rapid generation of a shopping list of items to be replaced.

Accordingly, the present invention provides a stock control computer system including a memory for storing a current stock list based on product codes; updating means responsive to input to said system of an electronic version of a receipt of purchases, including product codes, to add products purchased to said current stock list; deleting means responsive to an electronic indication of the codes of products disposed of to delete those products from the current stock list; comparing means for comparing the current stock list with a predetermined stock level; and indicating means responsive to such comparison for indicating which items of stock need replacing.

The updating means, deleting means, comparing means and indicating means may, according to the invention be provided by a computer program recorded on a medium.

Viewed from another aspect, the invention also provides a method of stock control employing a computer system having a memory for storing a current stock list based on product codes, said method comprising the steps of: in response to input to said system of an electronic version of a receipt of purchases, adding products purchased to said current stock list; in response to an electronic indication of the codes of products disposed of, deleting products from the current stock list; comparing the current stock list with a predetermined level of stock; and in response to said comparison, indicating which items of stock need replacing.

The use of an electronic version of the purchase receipt by the computer system thus speeds up the updating of inventory in turn enabling a shopping list to be prepared automatically and rapidly without direct customer involvement in selection and manipulation of items. The invention finds particular application in the control of stocks of everyday household items in the home which are likely to be purchased repeatedly from a common supplier, such as a supermarket. However, it may also be implemented in office or small business environments where casual purchases, resulting in purchase receipts, are made to supplement stock.

Preferably, a correlation between product codes and descriptions is generated from electronic till receipts of purchases by the customer and is provided over a communications network by e-mail or by a web application, written onto a smart card or even stored directly in a small hand-held computing device carried by the customer. This correlation is preferably stored in the computer memory and may be used to indicate product descriptions of the items needing replacement, as well as their product codes.

Although it is more convenient to use a correlation list held in the user's computer, and regularly updated, it would be possible instead to use a correlation list provided by the store over a network from the store's own product database.

Depending on the intended use of the indication of items needing replacement, the invention can thus provide either

a human readable shopping list of product descriptions for use in person or an electronic list of items which could be transmitted electronically to a remote computer at a product supplier.

It is preferred that the product codes used should be bar codes but any other coding system such as numerical coding could in theory be used. A bar code scanner in the home is the most convenient way of indicating electronically the codes of products being disposed of, either by consumption or by the discarding of out of date items.

If a hand-held device, like a palm-top computer were used, it could incorporate a bar code scanner.

Preferably, the list of products needing replacement would be generated by comparison of the updated inventory or stock list with a predetermined reference list of desired levels of stock. However, the comparison could simply determine whether products were in stock in the home or not, though this would not indicate how many were needed. In this case, the deleting means would not normally delete the product code, when stocks fell to zero but would maintain it in the stock list with an indication that the number held was zero.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described, by way of example only, with reference to a preferred embodiment thereof, as illustrated in the accompanying drawings, in which:

FIG. 1 is a schematic diagram of a stock control computer system according to the invention and of portions of a cooperating store computer system;

FIG. 2 is a block diagram of internal computer program and memory components of the stock control computer system of FIG. 1; and

FIG. 3 is a flow diagram illustrating a method of stock control according to the invention, carried out in the system of FIG. 1.

#### DETAILED DESCRIPTION OF THE INVENTION

In FIG. 1 the basic components of a computerised supermarket checkout system are shown schematically in electronic communication with a home based personal computer system, programmed and adapted for control of the stock of household products, food and the like.

The supermarket system comprises checkout stations 10, 10' etc., each consisting of a scanner 11 and a terminal comprising till 13 (cash register), display 14, printer 15 and card reader 16. The scanner operates by detecting conventional bar codes, printed on purchased items, and passes these to a main server computer 20 which is in communication with a database 21 storing bar codes, prices and product names. Prices and product names corresponding to the bar codes are identified and fed back to the terminal for display to the checkout operator and customer. The server, or possibly, the terminal itself lists all the items purchased and calculates the total price to be paid. Printer 15 prints the till receipt for the customer in conventional manner.

The payment process may involve the reading of a credit card in card reader 16 or may be a cash transaction. In recent years, it is becoming the practice for stores also to ask for and read a customer loyalty card, to be able to credit the customer with discounts or trigger the issue of redeemable coupons. Such customer cards are also used in recently developed self scanning systems to obtain a hand-held scanner with which the customer can scan products as

selected, the scanner being read instead of the checkout fixed scanner to speed up the checkout process.

Such loyalty cards, which may be of the magnetic stripe or of the "smart" variety (including semiconductor circuit memory) identify the customer to the server computer which, in this example, also holds the customer's electronic mail address for his or her home computer. The server also holds an electronic version of the till receipt, which, in this example includes not only product name, quantity and price but also the corresponding product bar codes. Either instantaneously or asynchronously, an electronic version 23 of this till receipt is sent to the customer over the Internet.

In the remainder of FIG. 1 is illustrated the customer's home system, including personal computer 30 with hard disk and main memory, a conventional display monitor 31, a printer 32 and a modem 33, allowing connection to the Internet. Also part of the home system of this example is a bar code scanner 34 including an infra-red transmitter for transmitting information to an appropriate input port of computer 30. The scanner may be used to scan codes on product packaging, such as can 35, after the product has been consumed or otherwise discarded, for example, because they are out of date.

The final element of FIG. 1 is a electronic shopping list 36, generated by the home stock control system in a manner to be described and transmitted to the store over the Internet via modem 33. After receipt and initial processing by the server 20, the list with the bar codes suitably translated into product names is passed to an order processing terminal 22 in a warehouse, where the customer's order can be assembled for collection or delivery. Alternatively, if required, a hard copy of the list can be printed by printer 32 and used for shopping in person.

The main elements of one example of a home stock control computer program according to the invention, together with data structures held in the memory of the personal computer 30 are shown in FIG. 2 and the steps of one example of a method of home stock control, as the program is executed are shown in the flow diagram of FIG. 3.

In the memory 40 of the computer 30, which may be disk or semiconductor main storage or any combination of the two, areas of storage are allocated as follows. A current stock list 41 contains bar codes and quantity information corresponding to the current contents of the household. A desired stock list 42 contains similar information indicating the desired quantity of each item. A correlation data base 43 correlates product bar codes and product names or descriptions. Finally, a shopping list 44 is created which contains bar codes, product descriptions and quantities. The electronically transmitted version 36 of the shopping list need not contain the descriptive information as this can be added by server 20 by reference to database 21.

The other software components of the system shown in FIG. 2 are an updating module 50 which receives the electronic till receipt 23 over the Internet and uses the information to update the current stock list and, as necessary, the desired stock list 42. A generating module 51, also uses the information in the electronic till receipt to build and update the correlation data base 43.

Deleting module 52 processes the input from the bar code scanner 34 and deletes from the current stock list any items which have been disposed of. The contents of the current stock list 41 and the desired stock list 42 are compared in module 53 whose output, together with correlation information from data base 43, is used to form the shopping list 44.



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The shopping list can be displayed on display 31 and edited using the computer keyboard or a pointing device by means of editing module 54. Display driver 55 and print driver 56 control the display and optional printing of the list. A transmit driver 57, formats and transmits the list over the Internet.

The detailed operation of the system and method will now be described with reference to FIG. 3.

Upon receipt of an electronic till receipt 23 in step 100, the generating module 51 determines in step 101 whether or not all the bar codes and descriptions exist in the correlation database 43. If they do not, the correlation data base is updated in step 102 with any new code/description pairs. It should be noted that bar codes may be reassigned by the store from time to time and so it is necessary to check that each code/description pair is identical to that stored for the same code. The correlation database is generated from scratch in this way and modified if necessary each time a new till receipt is transmitted.

After any necessary update of the correlation database, the current stock list 41 is updated by updating module 50 in step 103 with the bar codes and quantities of new items added to stock according to the electronic till receipt. If the till receipt shows in step 104 that new items, not currently on the desired stock list have been purchased, or existing items have been purchased but in greater quantities, then the desired stock list is updated by module 50 in step 105.

In step 110, the system receives a product code from scanner 34 to indicate that an item of stock has been disposed of. The deleting module 52, in step 111, then removes a corresponding item from the current stock list or reduces the number held in stock by one.

At some point, the customer decides to initiate a stock check with a view to preparation of a new shopping list in step 112. Compare module 53 compares the current and desired stock lists 41 and 42 in step 113 and generates a list of the codes and quantities of items needing replacement in step 114. These codes are correlated with the corresponding product descriptions in step 115 to produce the complete shopping list for display to the customer at step 116.

At this point, the customer may edit the list in steps 117 and 118 using Edit module 54 and the input devices of the personal computer (keyboard and mouse). When satisfied, the customer decides in step 119 whether to print the list at step 120 to keep either as a record or to use for a personal shopping trip to the store.

Whether or not the list is printed, the customer may then choose in step 121 to send the list to the store in step 122 as an advance order for collection or delivery. The program control then returns at step 123 to await either a further till receipt, at step 100, or a bar code scanner input, at step 110.

I claim:

1. A computer system for controlling a stock of products at a customers location comprising:

a point of sale computer server located at a sales outlet, having a customer interface which allows the inputting of customer identification data, said point of sale computer having a server which provides a product identification function, records data relating to products purchased by said customer, and generates a receipt identifying said purchased products, said point of sale computer having a first communication link having the capability of sending said receipt;

a customer computer located at said customer location, remote from said point of sale computer and having a second communication link for connecting to said first

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communication link to receive said receipt; said customer computer further comprising:

a reader for identifying products as they are used and generating an output relative thereto;

a memory for storing a current stock list of the contents of customer's stock of products; and a product identification data base; and

a processor for receiving said receipt, comparing said products purchased to said current list of stock contents and updating said current list; said processor further receiving said output of said reader and updating said current list of stock contents in response thereto.

2. A computer system for controlling a stock of products at a customers location, as described in claim 1, wherein said memory further stores a desired stock list and said processor compares said desired stock list with said current stock list and generates a shopping list.

3. A computer system for controlling a stock of products at a customers location, as described in claim 1, wherein said processor initially obtains the product identification data contained in the product identification data base from said receipt and compares the product identification data in a receipt to said product identification database in said memory and updates said product identification database.

4. A computer system for controlling a stock of products at a customers location, as described in claim 1, wherein said communication links are connected through a network.

5. A computer system for controlling a stock of products at a customers location, as described in claim 4, wherein said network comprises the Internet.

6. A computer system for controlling a stock of products at a customers location, as described in claim 1, wherein the products are identified by reading bar codes presented on each product and said product identification database contains data which correlates the bar codes to product descriptions.

7. In a computer system, a method for controlling a stock of products at a customers location, comprising the steps of: at a point of sale computer, generating a receipt containing product identification data of products purchased by said customer, and transmitting said receipt over a communications link;

receiving said receipt at a customer's computer;

processing said product identification data of products purchased to generate a current stock list of the contents of customer's stock of products; and to generate a product identification database; and updating said current stock list as receipts are received;

storing said current stock list and said product identification database in memory;

reading product identification data as products are removed from said customer's stock of products and updating said current stock list in response thereto.

8. In a computer system, a method for controlling a stock of products at a customers location further, according to claim 7, further comprising the steps of:

storing a desired stock list in said customer's computer; and

comparing said desired stock list with said current stock list and generating a shopping list of items to be bought.

9. In a computer system, a method for controlling a stock of products at a customers location, according to claim 7, further comprising the step of comparing the product identification data in a receipt to said product identification

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database in said memory and updating said product identification database.

10. In a computer system, a method for controlling a stock of products at a customers location, according to claim 7, wherein said receipt is transmitted via a network.

11. In a computer system, a method for controlling a stock of products at a customers location, according to claim 10, wherein said network is the Internet.

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12. In a computer system, a method for controlling a stock of products at a customers location, according to claim 7, wherein the products are identified by reading bar codes presented on each product and said product identification database contains data which correlates the bar codes to product descriptions.

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